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KERAMIC COLOURS FOR PORCELAIN PAINTING

THE pigmentary colours used in painting china differ from those used in painting easel pictures; the latter class of colours exhibit their hues when simply mixed and ground up in oil or varnish, whereas the colours used in painting on porcelain must be capable of becoming fused by heat and uniting with the 'glaze' which overlays the surface of the china clays. Owing to their fusibility and the fact that heat changes the colour or tone of many pigments, the range of colours available in porcelain painting is much more limited than those used in painting easel pictures. Great care is needed to be exercised in 'firing' the china when painted, so as to preserve or produce the exact tone of colour desired, but also to prevent the shape of the object altering by the intense and prolonged heat to which it is subjected.

Painting on china by means of ceramic colours is divided into two classes, termed 'over-glaze' and 'underglaze': that is, in 'overglaze' painting the china object is glazed first and then painted, and the painting fixed-on the glaze by firing; whereas in 'underglaze' painting the colours are laid on the china clay before the latter is glazed, and they are either fired in before the glazing is done, or the colours are burnt in with the glaze by laying on the coat of glaze after painting and before firing the object.

The colours, to render them fusible, are usually mingled with a lead base, or 'lead glass' as it is called; sometimes zinc, bismuth or other easily fusible metallic salt forms the fusible base; zinc salts, however, give a peculiar metallic colour, while lead salts produce a transparent glaze. Great skill is required in producing ceramic colours, but this skill is readily acquired by practice.

The process of preparing ceramic colours consists generally of mixing the several ingredients and compounding this mixture with a due proportion of lead glass or other suitable fusible base; the compound is then calcined in either porcelain or Hessian clay crucibles, the calcined mass levigated, dried and mixed with a suitable oil vehicle for painting on the china. The

vehicle usually employed to mix with the ceramic colours is fat turpentine—i.e., turpentine which has become resinified by long exposure to the air. Of course, out of access of dust. A very much better method of producing the turpentine in a suitable resinified condition is to put a little best quality oil of turpentine into a wide bottle, and corking up the bottle and standing it away in the dark for some months undisturbed. The bottle should not be filled more than quarter full with the turpentine, so as to allow a large quantity of confined air to act on the turpentine, which will oxidize it in a very much quicker time than by exposure to the air. Experienced china painters, however, will know what other vehicles to use, chief of which is oil of lavender.

RECIPES FOR KERAMIC COLOURS.

No. 1.—FORMULA FOR LEAD GLASS.

Ingredients:

12 oz. red lead (minium).

3 „ fine silicious sand.

1 „ calcined borax.

Fuse these ingredients together in a Hessian crucible, and after levigation, reduce the fused mass to a fine powder, for mixing with other ingredients in preparing the following colours:—

No. 2.—RED PIGMENT.

Ingredients:

Sulphate of iron (ferrous sulphate).

Lead glass.

Expel all the water of crystallisation from the sulphate of iron by heating the sulphate to a red heat in a clay crucible. In doing this the sulphate will first of all boil in the water as it is expelled, and then assume the appearance of a dirty buff-coloured powder. This powder, however, still contains the molecule of water, and to expel it the dirty powder must be raised to a red-hot heat. When this is accomplished, the red-hot mass in the crucible must be stirred with a glass or iron rod, so as to ensure all the water being driven off. Then allow the red-hot mass to cool, or turn it out into a tub of water, so as to extract all traces of sulphuric acid and undecomposed salt. Allow the mass to settle,

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draw off the water, syphon it off or else decant it without disturbing the deposit, and again wash the deposit with more (boiling hot) water, and collect the deposit on a filter and dry it in an oven or before a fire. When dry mix 7 oz. of the yellowish-red iron oxide thus obtained with 24 oz. of lead glass, which has been prepared by fusing 12 oz. of red lead with 1 oz. of calcined borax.

No. 3.—ORANGE KERAMIC PIGMENT.

Ingredients :

- 5 oz. oxide of iron (prepared as in last recipe).
- 4 oz. oxide of zinc.
- 16 „ silicious sand.
- 18 „ calcined borax.
- 48 „ red lead.

Fuse the ingredients in a Hessian crucible until the mass is perfectly homogeneous, then allow to cool, wash and dry ; by varying the proportion of these ingredients, different tones of yellow can be obtained.

No. 4.—RICH YELLOW PIGMENT.

Ingredients :

- (a) { 1 oz. tartar emetic.
- 2 „ nitrate of lead.
- 4 „ chloride of sodium.
- (dried in an oven.)
- (b) { 2 ozs. of red lead.
- 1 „ quartz sand.
- 1 „ calcined borax.

Fuse the first three ingredients together in a Hessian crucible at a strong heat until the residue is reduced to a fine powder, then wash it, dry and rub up in a mortar to make it as amorphous as possible. Separately prepare a lead glass by fusing the last three ingredients together.

For use mix :—

- 4 ozs. of the first preparation (as made in a).

with 3 ozs. of *b* compound.

Mix them in the dry state by sifting several times through muslin, and make into a ceramic paint with the vehicle.

No. 5.—LEMON YELLOW COLOUR.

Ingredients :

Mix together and fuse in a Hessian crucible—

- 1 lb. of potassic antimoniate.
- 5 ozs. of zinc oxide.

5 $\frac{3}{4}$ lbs. of lead glass (prepared as in No. 1).

When the mixture is fused to a fluid mass, allow it to cool, then reduce to a fine powder in a glass mortar for use as required.

No. 6.—DARK GREEN COLOUR.

Ingredients :

- 1 oz. sesquioxide of chromium.
- 3 „ lead glass (*vide* No. 1).

Mix together in the powdered state (*i.e.*, not fused together).

The sesquioxide of chromium can be prepared by colouring bichromate of potash with or without sal ammoniac ; but for the above pigment it is best prepared by putting some protochromate of mercury in a porcelain combustion tube which is open at both ends, and heating them until all the mercury has been expelled. Cool and wash the resulting oxide of chromium, and mix it with lead glass in the above proportions.

No. 7.—LIGHT GREEN COLOUR.

Ingredients :

- 1 oz. of dark green (*vide* No. 6).
- 6 „ lemon yellow (super).

Mixed together in dry powder for use.

No. 8.—RICH GREEN COLOUR

Is obtained by the use of transparent oxide of chromium. The preparation of this colour is too long to give here, but the writer will, perhaps, give instructions for its preparation in a separate paper.

BLUE KERAMIC COLOURS.

No. 9.—DARK BLUE.

Ingredients :

- 1 oz. pure sesquioxide of cobalt.
- 1 „ stannic oxide.
- 1 „ lead glass (*a*).
- 4 „ lead glass (*b*).

Fuse these ingredients for three hours, then pour out the contents of the crucible on to a marble or stone slab, and, when cool enough, rub it down to a fine powder on a thick sheet of glass, but the lead glass (*a*) is prepared by fusing together :

- 2 oz. of red lead.
- 1 „ of silicious sand.
- 1 „ calcined borax.

The lead glass (*b*) is prepared by calcining together :

- 2 oz. red lead.

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1 „ quartz sand.

No. 10.—LIGHT BLUE PIGMENT.

Ingredients :

1 oz. stannic oxide.

2 „ dark blue (prepared as in No. 9).

4 „ lead glass (prepared by fusing four parts of red lead with one part of sand.)

No. 11.—BLUE BLACK PIGMENT.

Ingredients :

1 oz. sesquioxide of cobalt.

9 „ stannic oxide.

25 „ lead glass (a).

5 „ lead glass (b).

Fuse as directed in No. 9.

The lead glass (a) is prepared by fusing

2 parts of red lead, and

1 part of sand.

Lead glass (b) is prepared by fusing

2 parts of red lead.

1 part sand.

1 „ borax, calcined.

No. 12.—BLUISH GREEN PIGMENT.

Ingredients :

1 oz. pure sesquioxide of cobalt.

1 „ protochlorate of mercury.

Mix the two ingredients by rubbing up in a glass mortar, and then heat the mixture a little at a time in a porcelain combustion tube, open at both ends, until all the mercury has volatilized. Collect the solid residue thus prepared and put it into a porcelain crucible ; put the cover on same, and submit the crucible and contents to the strongest heat the crucible will sustain, and continue the heating as long as the burning of the contents of the crucible continues. Then allow it to become cold, break up the crucible, and wash the contents with water until all traces of potash are removed, dry the residue — a compound of chromium oxide and sesquioxide of cobalt—for use.

(To be continued.)



WILL-O'-THE WISP
CIGAR LIGHTER
BY G. GURSCHNER